

Serial No.: 10/720,173
Docket No.: 102-1003
Amendment dated February 1, 2007
Reply to the Office Action of November 2, 2006

REMARKS

Introduction

Applicant notes with appreciation the Examiner's indication that claims 3, 5, 7, 12-18, 21-23, and 26-30 would be allowable if rewritten in independent form.

Upon entry of the foregoing amendment, claims 1-31 are pending in the application. No claims have been amended. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Rejection under 35 USC § 102

Claims 1, 4, 6, 8, 24-25 have been rejected under 35 U.S.C. §102(e) as being anticipated by the applicant's admitted prior art. This rejection is traversed for at least the reasons stated below.

The Examiner alleges in the Office Action mailed on November 2, 2006, that "Applicant's arguments filed on 10/20/06 have been fully considered but they are not persuasive" (Page 9, lines 9-10). The Examiner further alleges that "the Applicant's admitted prior art may not extend time to the same extent as the time extending part in figure 6, but it must extend time at least a little."

Applicant respectfully points out that the Examiner fails to show that AAPA explicitly or inherently shows the Applicant's "transient time extending part," as recited in the independent claims.

First, the AAPA does not describe the Applicant's "transient time extending part" in any paragraph describing the AAPA in Applicant's specification and FIG. 4.

Second, Applicant respectfully disagrees with the Examiner and points to a comparison between FIGS. 4 and 7. Applicant respectfully submits that the Examiner's interpretation of FIGS. 4 and 7 actually contradicts the Examiner's position, since the distinction between the admitted prior art of FIG. 2 and the claims of Applicant's invention (including those regarding

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FIG. 6) is further clarified by a proper comparison between FIG. 4 of the admitted prior art and FIG. 7 of Applicant's specification.

More particularly, FIG. 2 of the admitted prior art shows that the voltage (A) input to the buffer 144, which the Examiner equates with Applicant's "time extending element," is converted to the voltage output (B) by the buffer 144. However, FIG. 4 clearly shows that when the input voltage (A) is changed from low to high, the transient time (i.e., the amount of time taken to change between low voltage and high voltage and vice versa) is identical to the transient time of the output voltage (B), which also changes according to the input voltage (A). In other words, the amount of time it takes the voltage (A) (i.e., input to the buffer 144) to change is the same as the amount of time it takes the voltage (B) (i.e., output from the buffer 144) to change in FIG. 4 of the admitted prior art. This is evidenced by a width (i.e., a duration) of each transient time of voltage (A) and voltage (B) in FIG. 4. Thus, the buffer 144 of the admitted prior art cannot be interpreted as extending a transient time of the level converter 142 and/or the level shift unit 140 of the admitted prior art.

Third, stated differently, assuming for the sake of argument that the buffer 144 did extend the transient time of the level converter 142, then the transient time of the voltage (B) would have to be wider (i.e., longer in duration) than the transient time of the voltage (A), as illustrated in FIG. 4 of the admitted prior art. However, this is clearly not the case. Instead, FIG. 4 illustrates that the amount of time taken for the voltage (A) to change between the low voltage and high voltage is the same as the amount of time taken for the voltage (B) to change between the low voltage and high voltage, and vice versa. Thus, as set forth in Applicant's Remarks filed March 16, 2006, the buffer 144 (and/or the INV2) merely delays the output, but does not extend the "transient time during which the potential level of the signal inputted from the level converter to the switching unit is converted from a first signal level to a second signal level and vice versa," as recited in independent claim 1 of Applicant's invention.

On the other hand, FIG. 7 of Applicant's specification illustrates various voltage levels of voltages in the level shift unit 240 of FIG. 6. In particular, FIG. 7 includes voltage (A), which is input to the transient time extending part 243 of FIG. 6 and voltage (B), which is output from the transient time extending part 243 of FIG. 6. It is evident from FIG. 7 that the voltage (B) shown

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in FIG. 7 has a transient time that is greater than the transient time of the voltage (A) by an amount of time that corresponds to "D" and/or "E." Thus, unlike the admitted prior art of FIGS. 2 and 4, the transient time of the voltage (A) output from the level converter 241 has been extended by the transient time extending part 243 to the transient time of the voltage (B). Accordingly, Applicant respectfully submits that, contrary to the Examiner's assertions, **neither the buffer 144 of the admitted prior art of FIG. 2, the INV2 of the admitted prior art of FIG. 2, nor a combination thereof extends a transient time** "during which the potential level of the signal inputted from the level converter to the switching unit is converted from a first signal level to a second signal level and vice versa," as recited in independent claim 1 of Applicant's invention.

Fourth, Applicant's respectfully submit that the admitted prior art is limited to minimizing "the influence of the capacitance and inductance components, [by designing] the rising/falling times of a gate signal of the FETs 152 ... to be ... large enough in consideration of a capacitor charging/discharging time." See paragraph 0025 of Applicant's specification. In contrast, Applicant's invention alternatively minimizes the influence caused by the inductance property and capacitance property by extending "a transient time of the output potential level of the signal during which the potential level of the signal inputted from the level converter to the switching unit is converted from a first signal level to a second signal level and vice versa," as recited in independent claim 1. Therefore, since the admitted prior art and Applicant's invention have two clearly different mechanisms to perform the same function of minimizing the influence of the capacitance and inductance components, the admitted prior art clearly does not teach or disclose, among other things, "extend[ing] ... a transient time," as recited in independent claim 1. Accordingly, the admitted prior art does not anticipate independent claim 1 of Applicant's invention.

For at least the same reasons as stated above, **the buffer 140 of the admitted prior art does not "extend[ing] a transient time by a predetermined time in accordance with an output signal generating when the level of the inputted signal is converted the transient time being a time period during which the level is converted from a first signal level to a second signal level and vice versa,"** as recited in independent claim 6 of Applicant's

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invention. Accordingly, the admitted prior art does not anticipate independent claim 6 of Applicant's invention.

Nor can any component of the admitted prior art of FIG. 2 be interpreted as "a level shift unit generating a first nozzle selection signal having a first transient time, during which a level of the first nozzle selection signal is changed between first and second levels, in response to the control nozzle selection signal, and generating a second nozzle selection signal having a second transient time extended by a period from the first transient time," as recited in independent claim 8 of Applicant's invention. Accordingly, the admitted prior art does not anticipate independent claim 8 of Applicant's invention.

Similarly, the admitted prior of FIG. 2 does not disclose "a level shift unit to convert the nozzle selection signal to have a predetermined level to drive the heating element between a logic high and a logic low and having one or more logic units to increase a time required to change an output thereof between the logic high and the logic low," as recited in independent claim 31 of Applicant's invention. Accordingly, the admitted prior art does not anticipate independent claim 31 of Applicant's invention.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as contained in the...claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). "The elements must be arranged as required by the claim..." In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). Further, in the event that the Office Action is relying on the theory of inherency in any manner, "the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). See also MPEP 2112. Accordingly, since the admitted prior art does not explicitly or inherently teach every element as recited in independent claims 1, 6, 8, and 31, the admitted prior art cannot be properly used to reject independent claims 1, 6, 8, and 31 under 35 U.S.C. § 102. Therefore, it is respectfully

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submitted that independent claims 1, 6, 8, and 31 are allowable over the admitted prior art, and withdrawal of this rejection and allowance of these claims are earnestly solicited.

Regarding claims 4 and 24-25, it is respectfully submitted that for at least the reason that claims 4 and 24-25 depend from independent claims 1 and 8, respectively, and therefore contain each of the features as recited in these claims, claims 4 and 24-25 are therefore also patentable over the admitted prior art, and withdrawal of the rejection of these claims and allowance thereof are earnestly solicited.

Rejection under 35 USC § 103

Claims 2, 9-11, and 19-20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over the applicant's admitted prior art in view of U.S. Patent No. 6,273,537 to Hiwada (hereinafter "Hiwada"). This rejection is traversed for at least the reasons stated below.

Claims 2, 9-11, and 19-20 depend from allowable independent claims 1 and 8, respectively, and therefore include each of the features of these claims. The Examiner acknowledges that the admitted prior art does not disclose the features of claims 2, 9-11, and 19-20. See Office Action of May 25, 2006 page 9. However, the Examiner relies on Hiwada as allegedly teaching the features that the admitted prior art lacks. See Office Action of May 25, 2006 page 9.

Applicant respectfully submits that even if Hiwada does in fact teach the features of these dependent claims, as alleged by the Examiner, the admitted prior art and Hiwada, either separately or in combination with one another, fail to teach or suggest "a level shift unit having a level converter converting a potential level of a signal inputted therein into a predetermined potential level to drive the switching unit, and a transient time extending part provided with at least one time extending element to extend by a predetermined time a transient time during which the potential level of the signal inputted from the level converter to the switching unit is converted from a first signal level to a second signal level and vice versa," as recited in independent claim 1, and "a level shift unit generating a first nozzle selection signal having a first transient time, during which a level of the first nozzle selection signal is changed between first and second levels, in response to the control nozzle selection signal, and generating a

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second nozzle selection signal having a second transient time extended by a period from the first transient time,” as recited in independent claim 8 of Applicant's invention. Accordingly, claims 2, 9-11, and 19-20 are patentable over the references relied upon by the Examiner at least by virtue of their dependency on independent claims 1 and 8, respectively, and withdrawal of the rejection and allowance of these claims are earnestly solicited.

Further regarding dependent claims 2, 9, and 19, on page 8, lines 1-2 of the Office Action dated November 2, 2006, the Examiner relies on column 7, lines 65-67 as allegedly reading on Applicant's “discharging part discharging a residual voltage...of the switching unit,” as recited in claims 2, 9, and 11, respectively. As best can be understood, without more clarity in the Office Action, the Examiner appears to rely on an “actuator 105” of Hiwada as allegedly reading on Applicant's “discharging part,” as recited in claims 2, 9, and 11, respectively.

However, Hiwada states in column 7, lines 6-8 and 65-67, that “the driver circuit 1 then stops the application of the drive voltage to the actuator 105. As a result...an electric current flows from the actuator 105 through the transistor 3, thereby gradually discharging the actuator 105.” Hiwada further states in column 7, lines 4-6, that “the actuator 105 gradually charges up and deforms, thereby allowing ink to be supplied to the corresponding ink chamber.”

Accordingly, the actuator 105 is the device in Hiwada which deforms to allow ink to be supplied to an ink chamber. In contrast, Applicant's discharging part discharges a voltage of the “switching unit [which turns] on and off each of the heating elements to heat ink corresponding to selected nozzles to eject the ink,” as recited in independent claim 1. While Applicant's discharging part is directed to controlling the switching unit, Hiwada's actuator 105 does not control a switching unit, and is discharged itself by the driver circuit 1 so that it can deform to perform the functions of supplying ink. Therefore, Hiwada does not teach or suggest, among other things, a “discharging part discharging a residual voltage...of the switching unit,” as recited in claims 2, 9, and 11, respectively.

Therefore, since neither the admitted prior art nor Hiwada, either separately or in combination with one another, teach or suggest each of the features as recited in claims 2, 9, and 11, withdrawal of this rejection and allowance of these claims are earnestly solicited.

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Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,

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